Hort 310 – Medicinal Herbs
Spring 2020

Instructor: Ivette Guzman, PhD
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Office Hours: SKEEN N350; Mon and Wed 11:30 – 12:00, and by appointment: Email to set a time.

Class Meets: MWF 10:30 – 11:20 Skeen Hall W138

Internet Resources: This course is posted on Canvas with the syllabus and links to web resources and assignments for the course.

All students in this class **are required** to use their **nmsu.edu** internet accounts for contact and information about this course as well as activities and assignments conducted through the Canvas portion of the course.

All students in the class are required to be able to access computers with the following applications: an internet browser compatible with Canvas, a pdf viewer, and able to open and send files used by Word, Excel and Powerpoint. Computers with these functions are found in all of the NMSU student computer labs, libraries and other campus sites.

Textbook:

The constituents of Medicinal Plants (2nd Ed) by Andrew Pengelly,
paperback ISBN 0-85199-807-0 (required)

Copies of any additional required readings will be available as electronic files through the Canvas site.

Course Objective: To teach students the methods used to identify medicinal plants and to identify the chemical constituents associated with biological activity. Southwestern medicinal plants will be featured although plants and practices from around the world will be discussed. The functions of these chemical constituents in the plant, their sites of accumulation, and synthesis will also be presented. Students will participate in activities to extract and analyze chemical constituents in selected plants. Students will learn to work on scientific teams and to report results to peers.

Module 1: The first third of the course (January 22 – February 19) addresses ethnobotany, herbal safety issues, plant collection methods, effects of the environment on accumulation of bioactive compounds, as well as select examples of traditional knowledge systems for medicinal plants. The readings for this portion of the course will be provided on the course Canvas site. During this portion of the course students will learn how to conduct bioassays and to calculate IC50 values; and how to design experiments based on ethnobotanical information.

Module 2: The second third of the course (February 24 – April 3) will introduce extraction and analysis methods to detect medicinal compounds in plant material. Essential oils as a general class of medicinal compounds will be described and a basic introduction of functional groups in bioactive compounds will be demonstrated using chemical models. Students will learn to run thin layer chromatography plates to resolve different compounds from medicinal plants and how to interpret analytical data. Lab time will be

included to conduct team phytochemical extraction projects. They will also learn which plants are rich in bioactive/medicinal essential oils and the application of those oils for treatment of human diseases. Most of this section of the course is covered in the course textbook.

Module 3: The third of the course (April 8 – May 8) includes time to present their team phytochemical extraction project as well as presentations on additional classes of medicinal compounds: alkaloids, steroids, carotenoids and phenylpropanoids. These topics are covered in the course textbook.

Exams: There are three in-class exams, each covering the material presented in each of the three sections of the course. The third exam is held during exam week but IS NOT A COMPREHENSIVE exam. The third exam covers the material covered in module 3 of the course.

Grading:

Exams (3 for 100 points each)	300
Quizzes and graded class labs (5 for 20 points each)	100
Phytochemical report and class presentation	100
Total	**500**

Letter grades are assigned as follows: **A** >90 pts; **B** 80-89 pts; **C** 70-79 pts; **D** 60-69 pts; **F** < 60 pts.

Phytochemical Report: Teams comprised of four students will be formed and each team will select a regional medicinal plant to characterize. Students will research the literature about the plant, collect samples and perform triplicate extractions on usually dried preparations of these plants. The extracts will be analyzed and their chemical compositions interpreted. The results of this research will be reported in a written document and presented by the team to the class (**April 17 – 22).** The report will be styled around a standard short journal article and include a title, authors, introduction, materials and methods and a combined results/discussion section. This report is due **April 17, 2019**. Each team will submit one report. Students will be given an opportunity to grade the members of their own team's contribution to the report. Time for team discussions and lab activity is scheduled during the term, although **time outside of class time will be needed** to complete this assignment. Detailed instructions will be provided in class.

All students are expected to read the assignments before class and be prepared to contribute to the discussion. Short quizzes based on the reading assignments will be given to determine what information needs further explanation in class.

Students (usually **graduate level**) enrolled in the class, as Hort 450/500 for 3 credits, will be required to perform additional work to justify the graduate credit level. The additional assignment is expected to be the presentation of one of the course lectures, selected from the lecture schedule. This additional work is to be discussed and approved with the instructor within the first three class periods of the course.

Academic Misconduct: All NMSU students are responsible to inform themselves of the definition(s) of academic misconduct and the processes and policies followed at NMSU for violations of this code of student conduct. Details are posted on the NMSU web site: http://deanofstudents.nmsu.edu/studenthandbook/1-student-code-of-conduct/3-academic-misconduct.html

Student Accessibility Services: Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) covers issues relating to disability and accommodations. If a student has questions or needs an accommodation in the classroom (all medical information is treated confidentially), contact:

Trudy Luken, Director, Student Accessibility Services (SAS) Corbett Center, Rm. 244;
(575) 646-6840 sas@nmsu.edu; www.nmsu.edu/~ssd/

NMSU policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status.
Furthermore, Title IX prohibits sex discrimination to include sexual misconduct, sexual violence, sexual harassment and retaliation.

For more information on discrimination issues, Title IX or NMSU's complaint process contact:
Gerard Nevarez, Executive Director or Agustin Diaz, Associate Director
Office of Institutional Equity (OIE) O'Loughlin House
(575) 646-3635; equity@nmsu.edu ; http://www.nmsu.edu/~eeo/

HORT 310 SPRING 2019 COURSE SCHEDULE

Mondays		Wednesdays		Fridays	
		1/22	Introduction	1/24	Ethnobotany
1/27	Ethnobotany	1/29	Bioassays	1/31	Plant anatomy
2/3	**TCM with Dr. Dott**	2/5	Plant collection and ID	2/7	Plant conservation, biopiracy
2/10	Growing medicinal plants	2/12	Environmental effects	2/14	Native SW medicinal plants
2/17	Herbal safety regulations	2/19	Medical marijuana	2/21	**EXAM 1**
2/24	Traditional methods of extraction	*2/26*	*Herbal Honey Lab*	2/28	Intro to phytochemistry
3/2	Intro to phytochemistry	3/4	Chemical extraction methods	3/6	Separation/detection methods
3/9	Separation/detection methods	3/11	Volatile or essential oils	3/13	Volatile or essential oils
3/16	Volatile or essential oils	3/18	Volatile or essential oils	3/20	Phytochemistry lab work
3/23	----------*Spring Break*----------	*3/25*	----------*Spring Break*----------	*3/27*	----------*Spring Break*----------
3/30	Phytochemistry lab work	4/1	Phytochemistry lab work	4/3	Phytochemistry lab work
4/6	**EXAM 2**	4/8	Alkaloids	*4/10*	***Spring Holiday – No Class***-
4/13	Alkaloids	4/15	Alkaloids	4/17	Team reports
4/20	Team reports	4/22	Team reports	4/24	Steroids
4/27	Steroids	4/29	Carotenoids	5/1	Carotenoids
5/4	Capsaicinoids	5/6	Phenylpropanoids	5/8	Hallucinogenic plants
5/11	**EXAM 3** *10:30 am – 12:30 pm*				

This lecture schedule is subject to change. Every effort will be made to maintain the dates for the exams.
Any and all course changes will be sent out as a Canvas course announcement and using the nmsu emails for the course participants. All students enrolled in the course are required to read those emails and course announcements.